

#### ABSTRACT OF THE DISCLOSURE

A process for the plasma deposition of a layer of a microcrystalline semiconductor material is carried out by energizing a process gas which  
5 includes a precursor of the semiconductor material and a diluent with electromagnetic energy so as to create a plasma therefrom. The plasma deposits a layer of the microcrystalline semiconductor material onto the substrate. The concentration of the diluent in the process gas is varied as a function of the thickness of the layer of microcrystalline semiconductor  
10 material which has been deposited. Also disclosed is the use of the process for the preparation of an N-I-P type photovoltaic device.